Off grid Solar PV project at IAMGOLD Essakane SA Gold Mine

Document Prepared by AERA Group

On Behalf of IAMGOLD

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1 PROJECT DETAILS

1.1 Summary Description of the Project

"Off-grid Solar PV project at IAMGOLD Essakane SA Gold Mine" (hereafter referred to as the "Project" or "Project Activity") is a small-scale project activity, which involves the development, construction and operation by Essakane Solar S.A.S. of a greenfield solar PV plant with a total installed capacity of 14.928 MWp at the Essakane gold mine, which is in the Sahel region of Burkina Faso about 330 km North-East from Ouagadougou.

Jointly owned by IAMGOLD Corporation (90%) and the Government of Burkina Faso (10%), IAMGOLD Essakane SA, which owns and operates the Essakane gold mine, and produced 377,000 ounces of gold in 2016.

Being owned by Essakane Solar S.A.S. (hereinafter referred to as the "Project Implementer"), a specific purpose vehicle owned by Total Eren as a majority shareholder (>90%), the main objective of the project is to deliver clean, renewable energy based electricity to IAMGOLD Essakane SA. It will do so by adding capacity to the 11 existing fuel-powered engines, which is the scenario existing prior to the implementation of the project. The Project will replace fuel consumption of the technology in use.

The latitude of the Essakane gold mine offers very favourable radiation conditions throughout the year, with an average of 2,150 - 2,250 kWh / m^2 per year3. This allows an estimated electricity generation of approximately 28,868 MWh for the first full year and 24,881 MWh on a yearly average over the 7-year crediting period. The Project will result in 19,904 tCO2e of emission reductions per year or 139,329 tCO2e over a 7-year crediting period.

Implementation timeline

Date	Event
17-March-2017	Signature of the EPC contractor's contract
26-May-2017	Start of construction of power plant
from 01-May to 13-May-2018	Performance tests under EPC contract & power purchase agreement
01-June-2018	Effective start date of electricity production

1.2 Sectoral Scope and Project Type

Sectoral Scope : 1 - Energy industries (renewable - / non-renewable sources)

The project is a renewable energy type and is not a grouped project.

1.3 Project Eligibility

The project is eligible under the scope of the VCS Program because:

- It results in CO_2 emission reductions, one of the six Kyoto Protocol greenhouse gases
- It consists in electricity generation using (small scale) solar power plant in a Least Developed Country.

1.4 Project Design

The project has been designed to include a single installation of an activity.

Eligibility Criteria

N/A as the project is not a grouped project

1.5 Project Proponent

Organization name	Essakane Solar S.A.S.
Contact person	Mrs Emma KANTIONO
Title	Managing director
Address	06 BP 9302 Zogona 06 Secteur 13, Zone du bois Avenue Babanguida, Rue Kindfu
Telephone	+33 1 58 97 26 21
Email	emma.kantiono@essakane-solar.com

1.6 Other Entities Involved in the Project

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Organization name	AERA GROUP SAS
Role in the project	Carbon consultant
Contact person	Alexandre Dunod
Title	Head, Certification & Deliveries

Address	28 cours Albert Ier 75008 Paris
Telephone	+33 1 42 18 02 02
Email	a.dunod@aera-group.fr

1.7 Ownership

Essakane Solar owns a concession to produce and distribute electricity as per Ministry of energy's concession agreement to Essakane Solar SAS dated 28-April-2017.

1.8 Project Start Date

01 June 2018

The project started producing electricity at this date. It's the start date of the CDM crediting period.

1.9 Project Crediting Period

The project adopts a seven (7) years crediting period, renewable twice. The crediting period therefore is 1st June 2018 - 31st May 2025.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
01/06/2018 – 31/12/2018	13,471
2019	22,420
2020	21,299

2021	20,234
2022	19,223
2023	18,261
2024	17,348
01/01/2025 – 31-05-2025	7,073
Total estimated ERs	139,329
Total number of crediting years	7
Average annual ERs	19,904

1.11 Description of the Project Activity

The Project consists in the installation of a greenfield renewable power plant. The Project will rely on solar power source through photovoltaic conversion technology to produce electricity, which will be delivered to IAMGOLD Essakane SA.

The PV array will consist of 128,880 thin film (CdTe) photovoltaic modules, including 42,840 of 117.5 W (FS-4117-3 of First Solar Series 4™) and 86,040 of 115 W (FS-4115-3) for a total installed capacity of 14.928 MW provided by First Solar manufacturer through Wärtsilä EPC services.

The photovoltaic panels are arranged in line and fixed on galvanized steel support structures that will be nailed into the ground minimizing the occurrence of shadows or a variation in their orientation and inclination (15°).

The Project also includes 6 inverters and 3 transformers located in power powerhouses wired to the modules through buried cables. Two medium voltage overhead MV lines (6.6 kV) will then connect the project to the offtaker's busbar, which is connected to two existing fuel oil based electrical generator sets in the baseline scenario of a total capacity of 58.24 MW. They consist of a total of 11 electrical generator units (5 x 5,256 kW and 6 x 5,327.2 kW) of which 2 spare units (1 for maintenance, 1 for emergency spare).

A hybrid automation system (Wärtsilä Supervisory Control and Data Acquisition (SCADA) system, real-time controllers and photovoltaic combining switchgear) synchronizes the project plant with the existing fossil fuel-based power plant and allows the whole PV facilities to be manually or automatically controlled and monitored.

The meter equipment of the Project plan involves two bi-directional meters of Schneider Electric PowerLogic PM8240 meter of class 0.2S (active energy) and class 0.5S (reactive energy) at the two delivery points.

ID of the meters :

BAO904
Compteur 1 : SN/1706B040-02

Compteur 2: SN/1706B060-02

BAO911
Compteur 1 : SN/1706B032-02

Compteur 2: SN/1706B257-02

The figure below illustrates the project design and indicates the situation of the meters at the delivery points.

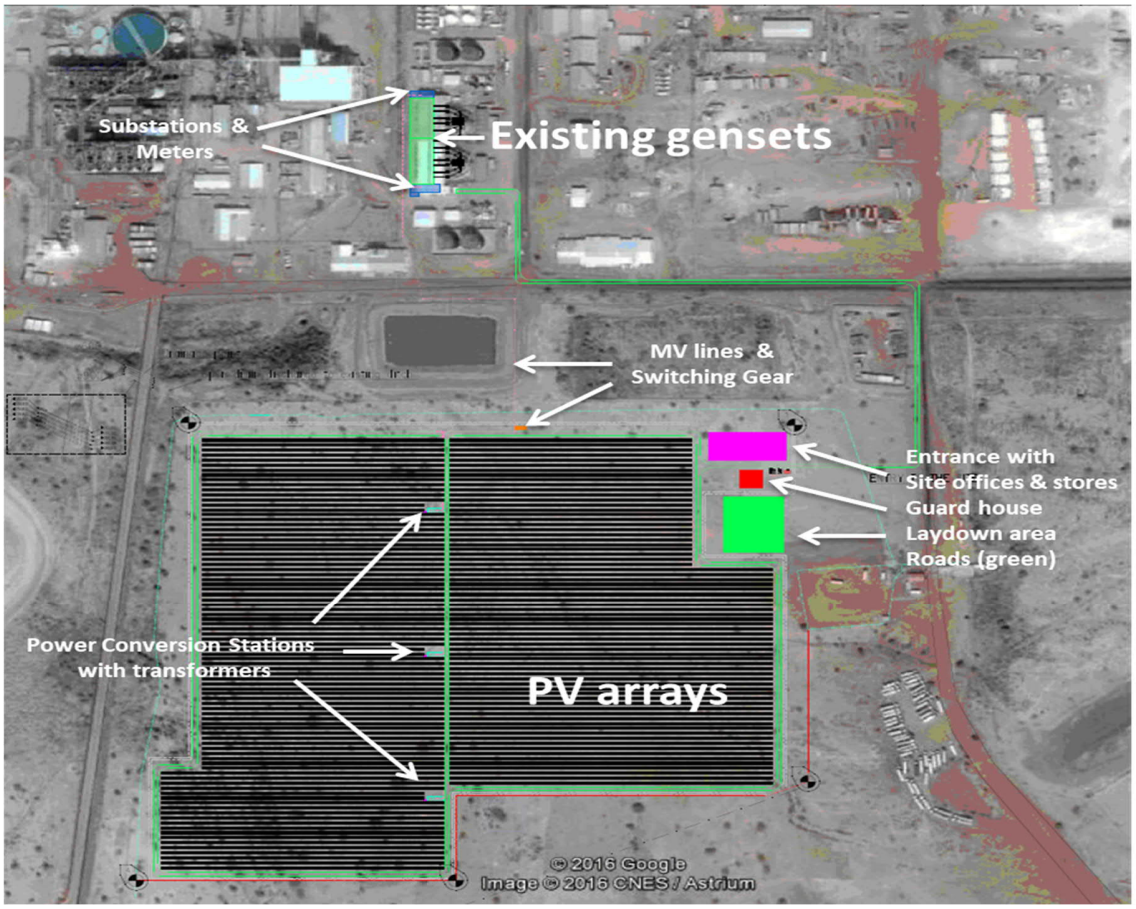


Figure 1: Site layout

The technical characteristics of the modules, inverters and transformers installed are identical or similar to those in the tables below:

Table 1: Electrical and mechanical characteristics of the modules (Standard Test Conditions)

Peak Power (W)	115 W	117.5 W
Type of cells	Thin-film CdTe semiconductor	
Rated voltage (V_{mpp}) (V)	69.3	70.1
Rated current (I_{mpp}) (A)	1.66	1.68
Efficiency (%)	16.0	16.3
Length (mm)	1,200	
Width (mm)	600	
Thickness (mm)	6.8	

Table 2: Technical data of the inverters

Parameter	Unit	Description
Manufacturer		ABB
Model		PVS980, -1909kVA-J
Maximum DC input power ($P_{PV,max}$)	kWp	3,055
Nominal AC output power (SN(AC))	kVA	1,909
Maximum AC output power (Smax (AC))	kVA	2,100
Output frequency range	Hz	50/60
Nominal output voltage	V	630
Maximum efficiency	%	98.8
Own consumption in operation	W	2,500
Own consumption in standby	W	225

Table 3: Technical data of transformers

Parameter	Unit	Description
Manufacturer	-	ABB
Rated power	kVA	3818
High voltage	V	6600
Low voltage (no load)	V	630 (630)
Rated frequency	Hz	50

Based on a mean annual global horizontal solar radiation potential estimated 2,242.5 kWh/m² for the project site and the specifications of the solar PV system, net annual output is conservatively expected at 28,868 MWh for the first year[1]. According to the warranty of the considered module manufacturer, the average annual power output degradation of the module is expected not to exceed 0.5 % per year over 25 years, which is also the typical lifetime of solar modules. All installed equipment is new.

The different types of losses are illustrated in the figure below.

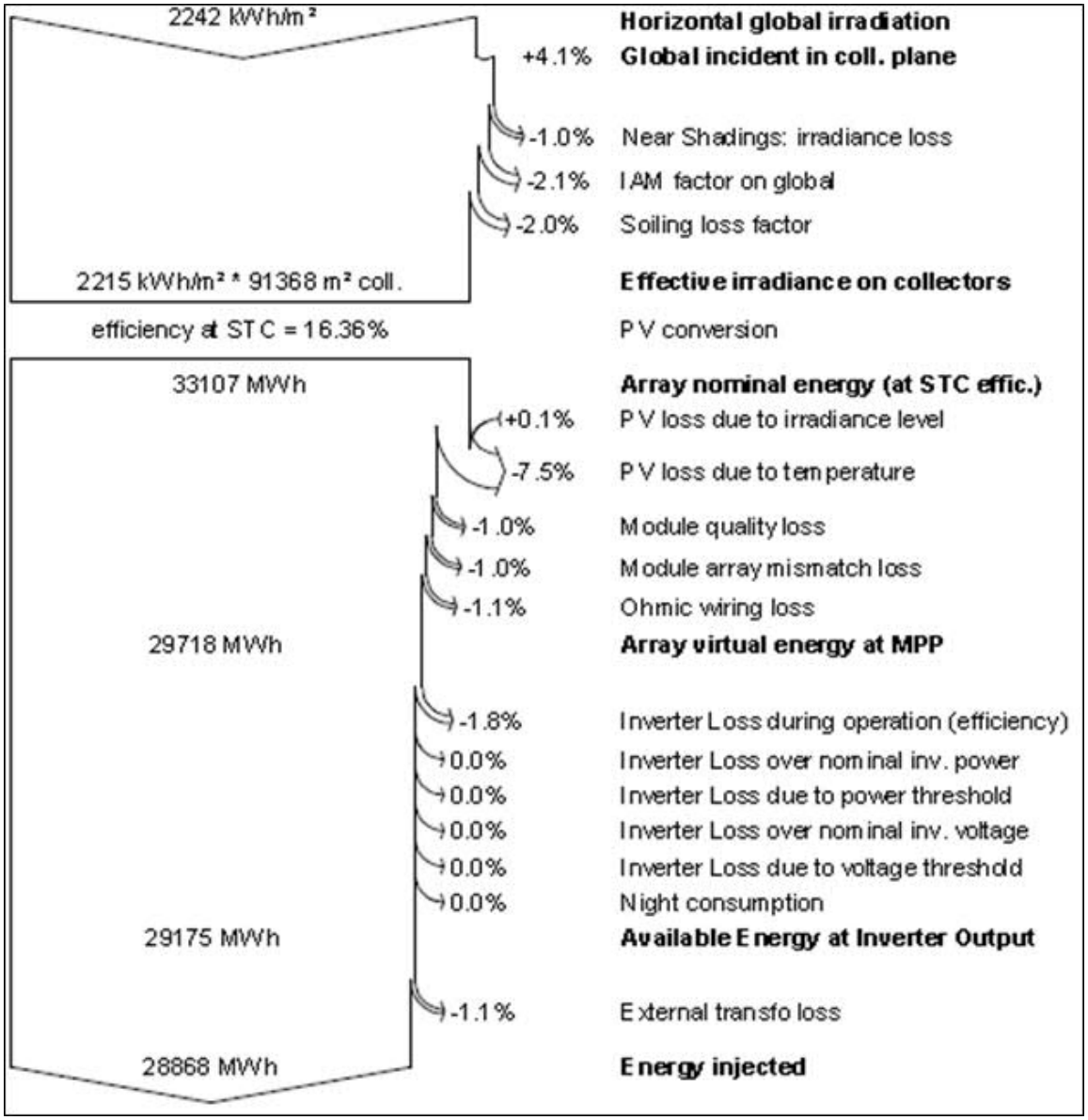


Figure 2: Loss diagram

[1] despites a slight upscaling of capacity by +0,1% since PVsyst simulation was performed

Expected load factor is 1,936 hours/year (22.1%) as per engineering company Wärtsilä's PVsyst performance study provided to banks and equity financiers while applying the project activity for project financing[2]; its corresponds to an estimated net annual power production of 28,868 MWh

1.12 Project Location

The Project is located in north-eastern Burkina Faso (host party), West Africa. It straddles the boundary of the Oudalan and Seno provinces in the Sahel region of Burkina Faso and is approximately 330 km North-East of the capital, Ouagadougou. It is situated 42 km East of the nearest large town and the provincial capital of Oudalan, Gorom-Gorom.

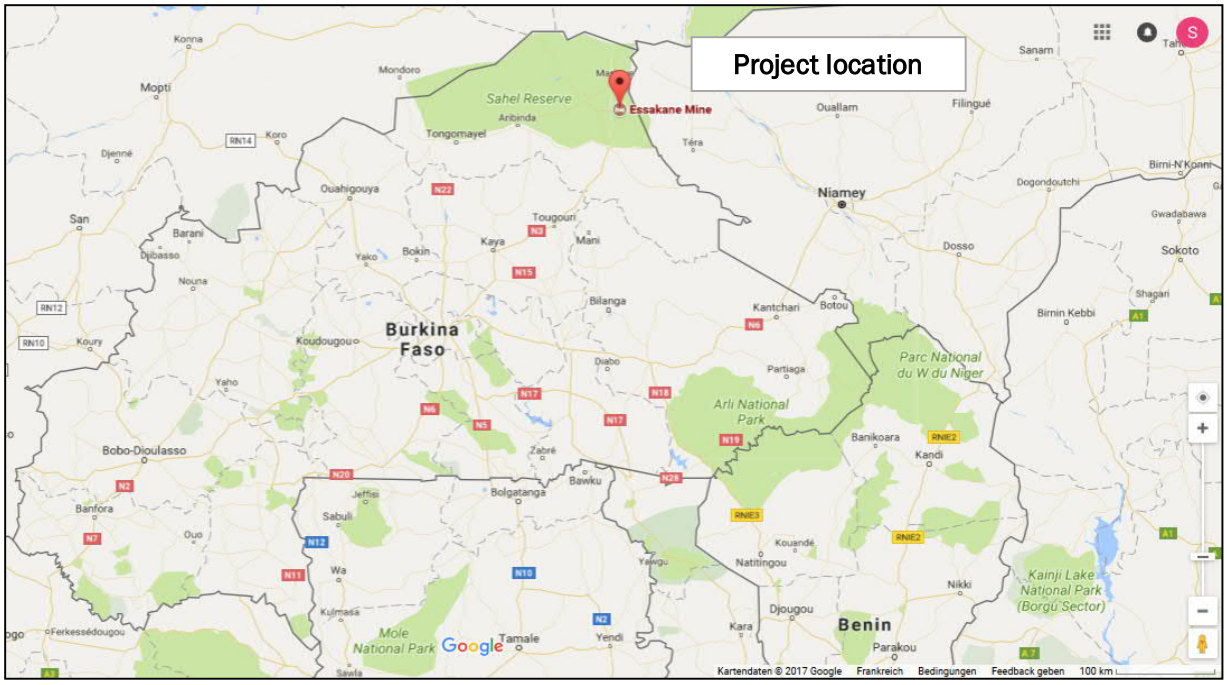


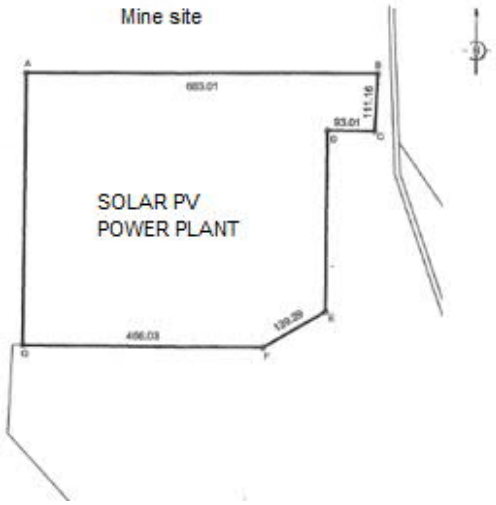
Figure 3: Project location in Burkina Faso

The six villages involved around the project site are:

- Essakane – site
- Essakane – village
- Falagountou
- Goulgountou
- Petabara – Seno
- Petabara - Oudalan

The diagram and map below reveal the exact geo-coordinates and situation of the Project site vis-a-vis the gold mine and the existing fossil fuel based power plants:

[2] In conformity with §3(a)(b) of the Guidelines for the reporting and validation of Plant Load Factors



	Latitude	Longitude
A	14°21'29.3'' N	0°4'30.1'' E
B	14°21'59.5'' N	0°4'52.9'' E
C	14°21'55.9'' N	0°4'52.8'' E
D	14°21'55.9'' N	0°4'49.7'' E
E	14°21'44.5'' N	0°4'49.7'' E
F	14°21'42.2'' N	0°4'45.7'' E
G	14°21'42.2'' N	0°4'30.1'' E

Figure 4: Project borders and project location on goldmine site

1.13 Conditions Prior to Project Initiation

The baseline is described by Paragraph 8 of AMS-I.A., Version 16 as "…the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate the equivalent quantity of energy…", estimated using one of three possible options.

For the project activity, Option 2 is applied, such that the energy baseline is calculated based on annual electricity generation from project renewable energy technologies as per the below:

$$E_{BL,y} = \sum_i EG_{i,y} / (1 - l)$$

Where:

$E_{BL,y}$	Annual energy baseline; kWh
$\sum_i$	The sum over the group of *i* renewable energy technologies (e.g. renewable energy technologies for solar home systems, solar pumps) implemented as part of the project activity.
$EG_{i,y}$	The estimated annual output of the renewable energy technologies of the group of *i* renewable energy technologies installed; kWh
l	Average technical and distribution losses that would have been observed in diesel powered minigrids installed by public programmes or distribution companies in isolated areas, expressed as a fraction.

The emission baseline is the energy baseline calculated in accordance with Paragraph 8(b) of AMS-I.A. times a default emission factor:

$$BE_{CO2,y} = E_{BL,y} * EF_{CO2}$$

Where:

$BE_{CO2,y}$	Emissions in the baseline in year, *y*; tCO_2
$E_{BL,y}$	Annual energy baseline in year, *y*; kWh
EF_{CO2}	CO_2 emission factor; tCO_2/kWh

For EF_{CO2}, default value of 0.8 kg CO_2-e/kWh, which is derived from diesel generation units, may be used.

The facilities, systems and equipment in the baseline scenario and how the project provides the same types and levels of services provided are further described in section 1.11

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

To date, there are no regulations and policies preventing the implementation of the project

activity. Through the National Economic and Social Development Plan (PNDES 2016-2020), the government of Burkina Faso plans to fill its energy gap. Indeed, the latter underlines its ambition to

increase the share of renewable energies in the energy mix in order to promote the country's self-sufficiency.[3]

1.15 Access to clean and inexpensive energy is a priority of Burkina Faso's Ministry of Energy, which aims to increase the national and rural electrification rates by 45% and 19% respectively by 2025.The Environmental Ministry granted the project implementer an approval ("Arrêté de Faisabilité Environnementale") on 12/01/2017, based on the findings and recommended mitigation measures included in the ESIS, IFC standards and the project implementer's own environmental and social policy.Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project is registered under the Clean Development Mechanism (Project #10398) on 05 May 2018, although its GHG emission reduction will either be claimed under the VCS programme or the CDM programme, never both.

CDM Monitoring period : 01-June-2018 – 31-May-2019, CER issued : 19,119 : https://cdm.unfccc.int/Projects/DB/KBS_Cert1502356514.63/iProcess/Applus1565174567.59/view

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

The project has neither sought nor received another form of GHG-related environmental credits.

1.17 Additional Information Relevant to the Project

Leakage Management

In accordance with AMS-I.A., Version 16, if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered. This is not the case in this project and as such leakage emissions are not considered. Thus there is no leakage management.

[3] http://cns.bf/IMG/pdf/pndes_2016-2020-4.pdf

Commercially Sensitive Information

There is no information deemed as commercially sensitive for this project activity.

Sustainable Development

Sustainable development

While the the UN General Assembly adopted new global Sustainable Development Goals (SDGs) on 25 September 2015, Burkina Faso's "National Sustainable Development Policy" (NSDP) of 2013 and the "Burkina 2025" outlook remain in place outlining Burkina Faso's sustainable development policy. The NSDP stresses the objective of promoting a green economy and lays down guiding principles for action. The Burkina 2025 provides analyses, vision and strategies. A new and more specific "Strategy for Accelerated Growth and Sustainable Development (SAGSD) 2016-2020" is currently being drafted.

The Project contributes to Burkina Faso's sustainable development policy as follows:

- Access to electricity as a production factor and resource management:

The Project reduces the country's dependency on imported fossil fuel and its price fluctuations. By making use of a local energy source, which is well suited to the local climate conditions, the project reduces fuel logistics for the largest private company in Burkina Faso located in a remote area, attracts foreign direct investment and increases national energy security/self-sufficiency.

- Access to technologies and development of human capital (through employment and training):

The Project constitutes a significant step forward in the promotion of solar technology in Burkina Faso[4]. It provides an opportunity of knowledge transfer through training and employment of local staff during the operation and construction phases of the Project. The Project will set an example for technology diffusion and CDM reference for stakeholders who plant to implement similar technologies in the region. Up to 100 jobs are created during construction phase, while project operations will employ about 40 people on the long term, most of them originating from the 6 nearby locations.

Further Information

- Healthy life and environment:

The Project does not only address climate change by reducing the amount of GHG emissions generated from the electricity production, it also reduces the amount of noxious SO_2, NO_x, PMs, CO and VOC emitted into the air from burning fossil fuel. Health effects include premature death, acute respiratory illness, aggravated asthma, chronic bronchitis and decreased lung function. Solar PV technology is furthermore noise-free and this Project will be installed at an existing industrial site, i.e. with little negative impact on the environment and activities of nearby communities. The Project Implementer commits to

[4] Since 2015 installed capacity of about 325 MW which consisted exclusively of thermal and hydro power plants (cf. http://sonabel.bf/index.php/nous-connaitre/metiers/production), the largest solar power plant in West Africa has been partially commissioned as CDM-CPA 10320-0003 in September 2017 (33.7 MW Zagtouli)

allocating approximately 1% of the Project turnover to local communities (about 50,000 USD/year) and to implement an environmental and social monitoring plan.

The project participants obtained all necessary clearances; hence no legislative, economic, sectoral, social, environmental, geographic, site-specific risks are anticipated which may have impact on the eligibility of the project activity and the net GHG emission reductions.

2 SAFEGUARDS

2.1 No Net Harm

Receiver	Impacts	Environmental action	Objective of the action	Action stains	Actors of the action	Costs in FCFA	Follow-up Actor	Implement ation schedule work	Monitoring indicator s
Air	Air quality degradatio n due to gaseous emissions (VOC, CO, CO_2, NOx)	Providing site personnel with personal protective equipment Maintenance of site vehicles Watering of the site	Reduce the emission of CO, CO2, NOx, and dust in the atmosphere	Search for a qualified provider	ESSAKANE SOLAR	Included in the construction contract with the contractor in charge of the construction of the plant	ESSAKANE SOLAR BUNEE	During construction	Compliance of emissions with national standards, Number of complaints
Sound environment	Noise nuisance due to localized increase in noise levels	Use of less noisy equipment during work, Regular maintenance of equipment	Reduce noise pollution caused by product transport vehicles	Search for a qualified provider	ESSAKANE SOLAR	Included in the construction contract with the contractor in charge of the construction of the plant	ESSAKANE SOLAR BUNEE	During construction	Condition of construction equipment Number of complaints

Soil	Soil pollution	Proper management of solid and liquid waste and hydrocarbon stocks	Avoid soil pollution by waste disposal (used batteries if used and leakage of motor oil) Avoiding contamination	Ensure the collection of waste and its deposit in approved sites Conduct regular inspections of facilities to ensure the absence of leaks	ESSAKANE SOLAR	1 000 000	ESSAKANE SOLAR BUNEE	During construction and operation	Existence of an inspection schedule for the facilities, Number of inspections performed per year Site compliance with soil pollutant discharge standards
Water resources	Risk of pollution of ecosystems aquatic	Management of spills accidental of hydrocarbons	Minimize the risks of pollution by hydrocarbons	Formation of the staff on the management of liquid waste Training on techniques for decontamination of contaminated sites	ESSAKANE SOLAR	500 000	ESSAKANE SOLAR BUNEE	During operation	Number of training sessions number of people trained
Security	Risks accidents involving employees and those of company s surrounding es	Formation of the staff on the fire hazards and the means to prevent or treat them. Equipping employees of PPE. Respect for instructions for security of the mine.	Avoiding injuries and the loss of life human	Organize sessions of training on sources potential for fires to occur in the unit and on the means of control against these fires	ESSAKANE SOLAR	Included in the construction contract with the contractor in charge of the construction of the plant	ESSAKANE SOLAR BUNEE	During construction and the operation	Number of sessions of training made Level application of the measures of security Number of accidents

Vegetation	Destruction of vegetation cover	Recovery of the upper soil horizons (arable soils) to be used for rehabilitation purposes; Carrying out the compensation plantings; Monitoring and maintaining the plants for at least three years after they are planted, Compensation loss of utility trees	Restore destroyed vegetation cover	-location identification storage of topsoil, stripping, transport and disposal Research of the reforestation site, Acquisition of plants, -cooking Planting of the seedlings	ESSAKANE SOLAR	4 455 000	ESSAKANE SOLAR BUNEE, DREEVCC/Sahel	Operation phase	Area reforested, Number of plants planted, Success rate of the plants planted -
Landscape	Landscape modification	Realization of planting of alignment and hedges on the perimeter of the institution	Improve the living and working environment	Search for a landscaping specialist	ESSAKANE SOLAR	2 000 000	ESSAKANE SOLAR BUNEE	Operating phase	Existence of landscaping
Employment	Creation of temporary and permanent jobs	Recruiting female staff where possible	Increase the social acceptability of the project	Organize the recruitment of local employees	ESSAKANE SOLAR	PM	ESSAKANE SOLAR	Before starting up the plant	Number of local jobs created, Proportion of female staff working in the plant
Agriculture and livestock	Loss of agricultural land	Compensation of the loss of the agricultural Compensations financial loss of land agricultural Compensation for the	Restore the means of subsistence of people impacted	Accompany PAPs in the search for agricultural land Develop the land acquired - Evaluate the cost of the loss of productivity	ESSAKANE SOLAR	19 814 400	ESSAKANE SOLAR BUNEE	During the construction phase	Compensated land area -area of developed land for PAPs Level of productivity of land acquired

		loss of grazing land productivity							for the populations Number of complaints
Home	Loss of a building	Compensation financial	Allow the owner to rebuild his house	Assessing the value of the impacted building	ESSAKANE SOLAR	1 890 000	ESSAKANE SOLAR BUNEE	Before the start of work	Payment status

Overall, ESIS states that “the negative impacts generated by the project are manageable because the magnitude of the anticipated changes on most of the different environmental components that will be affected remains average to negligible.”

As a consequence, the Environmental Ministry granted the project implementer an approval (“Arrêté de Faisabilité Environnementale”) on 12/01/2017.

Based on the findings and recommended mitigation measures included in the ESIS, the ministerial approval, IFC standards and the project implementer’s own environmental and social policy, the project implementer introduces an Environmental and Social Management System (ESMS), which includes a general environmental and social policy, a compensatory agreement signed with the impacted communities, a stakeholder engagement plan and lays ground for a decommissioning plan. The Bureau National des Evaluations Environnementales (BUNEE), an agency of the Ministry of Environment for Burkina Faso, will act as an external auditor and monitor the ESMS implementation during 3 years with two inspections per year.

2.2 Local Stakeholder Consultation

No grievance was registered during this monitoring period. However, the grievance mechanism is as follows:

1. Reception: Applications are received either at the headquarters in the Zogona district of Ouagadougou or in theOuagadougou, or at the information centers of the Health, Safety and Sustainable Development Development Department. Depending on the geographical location of the request, mail is forwarded either to the Corporate Affairs Department (requests at the national level) , or to the SSDD Department (requests at the regional level)

2. Processing: once received, the requests are recorded in a follow-up table (model in annex 2) and are analyzed every week by the department concerned, especially during team meetings. Validation is done by the head of the department or his representative.

3. Result: once the request has been processed, the results of the analysis are communicated to the applicant

2.3 Environmental Impact

N/A (see registered CDM PDD).

2.4 Public Comments

N/A (see registered CDM PDD).

2.5 AFOLU-Specific Safeguards

N/A (not an AFOLU project)

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

N/A (see registered CDM PDD).

3.2 Applicability of Methodology

N/A (see registered CDM PDD).

3.3 Project Boundary

N/A (see registered CDM PDD).

3.4 Baseline Scenario

N/A (see registered CDM PDD).

3.5 Additionality

N/A (see registered CDM PDD).

3.6 Methodology Deviations

No methodology deviation were applied.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

N/A (see registered CDM PDD).

4.2 Project Emissions

N/A (see registered CDM PDD).

4.3 Leakage

N/A (see registered CDM PDD).

4.4 Estimated Net GHG Emission Reductions and Removals

According to AMS-I-A, emission reductions are calculated as:

$$ER_y = BE_{CO2,y} - PE_y - L$$

Where:

ER_y	Emission reductions in the year y; tCO_2e
$BE_{CO2,y}$	Emissions in the baseline in the year, y; tCO_2e
PE_y	Project emissions in the year, y; tCO_2e
L	Leakage in the year, y; tCO_2e

	Value/Result	Unit	Source/reference
Total installed capacity	42,840x117.5W+86,040x115W 14,928	MW_p	CDM PDD Section A.3 / Project document
Net electricity delivered to the grid, average year ($EG_{PJ,y}$)	24,881.14	MWh	A.3; B.7 [$E_{BL,y} = \Sigma_i EG_{i,y} / (1 - l)$]
Baseline emission factor (EF_{CO2})	0.8	tCO_2/MWh	CDM PDD Section B.6.1 and Section B.6.2
Baseline emissions (BE_y)	24,881 MWh/yr x 0.8 tCO_2/MWh = 19,904	tCO_2/y	$BE_y = EG_{PJ,y}$ x $EF_{grid,CM,y}$
Project emissions (PE_y)	0	tCO_2/y	CDM PDD section B.6.1
Emission reduction (ER_y)	19,904	tCO_2/y	$ER_y = BE_y - PE_y$

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
01/06/2018 – 31/12/2018	13,471	-	-	13,471
2019	22,420	-	-	22,420
2020	21,299	-	-	21,299
2021	20,234	-	-	20,234
2022	19,223	-	-	19,223
2023	18,261	-	-	18,261
2024	17,348	-	-	17,348
01/01/2025 – 31/05/2025	7,073	-	-	7,073

Total	139,329	-	-	139,329

5 MONITORING

5.1 Data and Parameters Available at Validation

Not applicable (see registered CDM PDD)

5.2 Data and Parameters Monitored

Not applicable (see registered CDM PDD)

5.3 Monitoring Plan

Not applicable (see registered CDM PDD)

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	EGy
Data unit	kWh/y
Description	Annual net output of the solar photovoltaic power plant
Value applied:	2019: 13,774 ; 2020: 23,443
Comments	As per PowerLogic PM8000 Series manual, "all meters are tested and verified at the factory in accordance with International Electrotechnical Commission (IEC) and American National Standards Institute (ANSI) standards. [These] digital power meters typically do not require re-calibration". Besides the installation of a main & back-up meter at each feed-in point, reconciliation of measurement results between Essakane Solar and IAMGOLD occur monthly before electricity invoicing takes

place. Furthermore, Essakane Solar installed own meters at the transformer's point for transmission losses assessment.

The meter equipment of the Project plan involves two bi-directional meters of Schneider Electric PowerLogic PM8240 meter of class 0.2S (active energy) and class 0.5S (reactive energy) at the two delivery points.

ID of the meters :

BAO904
Compteur 1 : SN/1706B040-02

Compteur 2: SN/1706B060-02

BAO911
Compteur 1 : SN/1706B032-02

Compteur 2: SN/1706B257-02

6.2 Baseline Emissions

The baseline is described by Paragraph 8 of AMS-I.A., Version 16 as "...the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate the equivalent quantity of energy...", estimated using one of three possible options.

For the project activity, Option 2 is applied, such that the energy baseline is calculated based on annual electricity generation from project renewable energy technologies as per the below:

$E_{BL,y} = \sum_i EG_{i,y} / (1 - l)$

Where:

$E_{BL,y}$	Annual energy baseline; kWh
$\sum_i$	The sum over the group of *i* renewable energy technologies (e.g. renewable energy technologies for solar home systems, solar pumps) implemented as part of the project activity.
$EG_{i,y}$	The estimated annual output of the renewable energy technologies of the group of *i* renewable energy technologies installed; kWh
l	Average technical and distribution losses that would have been observed in diesel powered minigrids installed by public programmes or distribution companies in isolated areas, expressed as a fraction.

The emission baseline is the energy baseline calculated in accordance with Paragraph 8(b) of AMS-I.A. times a default emission factor:

$BE_{CO2,y} = E_{BL,y} * EF_{CO2}$

Where:

$BE_{CO2,y}$	Emissions in the baseline in year, *y*; tCO_2
$E_{BL,y}$	Annual energy baseline in year, *y*; kWh
EF_{CO2}	CO_2 emission factor; tCO_2/kWh

For EF_{CO2}, default value of 0.8 kg CO_2-e/kWh, which is derived from diesel generation units, is used.

Month	BE_y	$E_{BL,y}$	EF_{CO2}
	t CO_2	MWh	tCO_2/MWh
June 19	1,470	1,838	0.8000
July 19	1,385	1,731	0.8000
August 19	1,453	1,817	0.8000
September 19	1,593	1,991	0.8000
October 19	1,632	2,041	0.8000
November 19	1,732	2,166	0.8000
December 19	1,751	2,189	0.8000
January 20	1,603	2,005	0.8000
February 20	1,690	2,113	0.8000
March 20	1,709	2,137	0.8000
April 20	1,456	1,821	0.8000
May 20	1,460	1,826	0.8000
June 20	1,346	1,683	0.8000
July 20	1,471	1,839	0.8000
August 20	1,436	1,796	0.8000
September 20	1,450	1,814	0.8000
October 20	1,763	2,204	0.8000
November 20	1,665	2,081	0.8000
December 20	1,699	2,125	0.8000
TOTAL	**29,764**	**37,217**	0.8000

Thus, $BE_{CO2,y}$ = 37,217 kWh * 0.0008 tCO_2/kWh = **29,764** tCO2.

6.3 Project Emissions

The project activity is a solar PV project and auxiliary consumption is taken account in the net electricity off-taken by the mine. Therefore, as per the applied methodology AMS-I.A., the GHG emission from the project activity is considered as zero.

6.4 Leakage

No leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

6.5 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2019	11,016	-	-	11,016
2020	18,748	-	-	18,748
Total	29,764	0	0	29,764

The estimated amount of emission reduction for this period is calculated as follows: Total days= 580, Annual average VERs=19,904 tCO_{2eq}, Thus, estimated ER for this monitoring period = 31,628 tCO_{2eq} Difference= -5.9%